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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,568	12/20/2001	Christopher W. Gabrys	IG2224US	9553

7590

02/04/2003

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EXAMINER

MULLINS, BURTON S

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 02/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,568

Applicant(s)

GABRYS, CHRISTOPHER W.

Examiner

Burton S. Mullins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-18 is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on April 18, 2002 has been considered by the examiner.

Specification

2. The disclosure is objected to because of informalities at the following locations: p.3, lines 13-14; p.9, line 21; and p.11, line 25. Appropriate correction is required.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 'operative axial length X' and 'body cylinder length L' (claim 9) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 1, 5 and 9 are objected to because of the following informalities: In claim 1, line 13, delete the comma after "capacity" and insert a comma after "R". In claim 5, line 2, insert ---a--- before "center" and on the third-to-last line, insert ---wherein--- before "said flywheel". In claim 9, line 2, insert ---a--- before "center". Also, the syntax of "having a magnetically operative axial length" is improper because it is not clear if this refers to the

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radial or the axial bearing. Beginning on the third to last line, change "length, X in" to ---length X, in---; "length, L in" to ---length L, in---; and "speed, V in" to ---speed V, in---.

In claim 17, line 3, change "5" to ---five---. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, recitation "operating load capacity" is vague since it is not clear if this refers to axial or radial loading. For examination purposes it will be assumed that the equation relates radial load capacity to flywheel mass.

Allowable Subject Matter

7. Claims 5-19 are allowed. Claims 1-4 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Benedetti is the closest prior art. Benedetti teaches a solid steel flywheel 210 (Fig.14A; c.7, line 54; c.8, lines 30-35), free of any center hole, supported for rotation about a vertical axis by upper and lower magnetic bearings and rotating at 12,000 rpm (c.7, line 55); a brushless, DC motor-generator 40/41 (c.6, lines 24-26 & c.6, line 58-c.7, line 3) connected to the flywheel for storing and retrieving energy; a container or "vacuum enclosure" 5 (c.3, lines

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15-16); upper and lower radial magnetic bearings and at least one axial thrust magnetic bearings comprising magnetic rings 12/14 and 13/15 providing radial and axial restoring forces (Fig.1; c.3, lines 18-33), a “radial damping system” comprising rotor elements 16/17 and stator elements 18/19 (Fig.1; c.3, lines 33-35), and a “double electromagnet” or “axial actuator” comprising coils 21 and 22 (Fig.1; c.3, lines 40-54).

However, it is not clear that Benedetti teaches a five-axes magnetic bearing system since the radial and axial bearings appear to function only in the radial and axial directions (i.e., three-axes in a Cartesian coordinate system) and do not take into account pitch or yaw of the flywheel about the rotational axis.

Further, regarding the claim 1, applicant recites a specific relation between the magnetic bearing radial operational load capacity R related to flywheel mass M at zero rotational speed to be $0.170M < R < 0.838M$. This amounts to a functional relation describing the maximum tilt angle the radial bearings in applicant's invention would allow. In Benedetti, there is no teaching or suggestion that such a function is possible at zero speed. In fact, the magnetic bearings at zero speed do not support the flywheel; rather, mechanical touch-down bearings 50 support the flywheel (c.3, lines 60-63) before lift-off operation initiated by a “lift-off logic” 28. Finally, while Benedetti's axial magnetic bearings would presumably support the flywheel axially, thus compensating the axial load of the flywheel, there is no teaching or suggestion regarding limitations of the radial loading on the bearings.

Regarding claim 5, there is further no teaching or suggestion that the operating rotational speed of Benedetti's flywheel remains above that at which flexural resonance modes occur.

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Regarding claim 9, there is no teaching or suggestion in Benedetti of the claimed relationship between the axial magnetic bearing operative length X, the flywheel cylinder length L, and the flywheel speed V wherein $X \geq 9.25 \cdot 10^{-8} V^2 L$.


Regarding claim 13, there is no teaching that the axial thrust magnetic bearing in the five-axes bearing system comprises a homopolar magnetic bearing.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 305-1341 for regular communications and 305-1341 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.


Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
January 29, 2003